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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/815,054

03/31/2004

Che-Hsiung Hsu

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09/13/2006

E I DU PONT DE NEMOURS AND COMPANY
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EXAMINER

WEBB, GREGORY E

ART UNIT

PAPER NUMBER

1751

DATE MAILED: 09/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/815,054

Applicant(s)

HSU ET AL.

Examiner

Gregory E. Webb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>0704</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Cao, Yong (US20020038999).

Concerning the dispersion, Cao, Yong teaches the following:

[0193] Example 1 was repeated, but 1.7 g of PAM (Polysciences, M.W. 4-6M) was added into aniline-PAAMPSA-water mixture. After vigorous stirring and complete dissolution of PAM in the reaction mixture the oxidant was added into reaction mixture. All other steps were the same as Example 1. A PANI(ES)-blend with polyaniline to PAM ratio of 1:2 was prepared directly from polymerization. Aqueous solutions/**dispersions** (for example, 1 or 2% w/w) of the final product

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were prepared by stirring of the resulting powder in deionized water at room temperature for 24 hours in a plastic container. The solution was filtered through a 0.45 μm filter. The bulk conductivity of a thin film spin-cast from the resulting aqueous **dispersion** was measured to be (approximately 10^{-6} S/cm); i.e. three orders of magnitude lower than the film from Example 1 of same thickness; and one order of magnitude lower than that of blend prepared by mixing of aqueous **dispersion** from Example 1 and PAM solution in water (see Example 5).

(emphasis added)

Concerning the conductive polymer, conductive and the polymers, Cao, Yong teaches the following:

[0011] Thus, there is a need for a formulation of high resistivity **conductive polymers** such as PANI(ES) for use in high efficiency pixelated polymer emissive displays. Conductive **polymers** with resistivity greater than 10^4 ohm-cm is preferred; more preferably in excess of 10^5 ohm-cm; and still more preferred in excess of 10^6 ohm-cm. To be useful in polymer emissive displays, the high resistivity **conductive polymer** layer should give long lifetime without significant current leakage between neighboring pixels. *(emphasis added)*

Concerning the preferred conductive polymer, most preferred conductive polymer and the thiophene, Cao, Yong teaches the following:

[0066] When the terms "**polyaniline**" or PANI are used herein, they are used generically to include substituted and unsubstituted materials, as well as the other equivalent conjugated conductive polymers such as **polypyrrole** or **polythiophene** or PEDT, unless the context is clear that only the specific nonsubstituted form is intended. It is also used in a manner to include any accompanying dopants, particularly acidic materials used to render the **polyaniline** conductive. *(emphasis added)*

Concerning the ethers, Cao, Yong teaches the following:

[0122] In the preferred systems, the PANI and bulk polymer are both water-soluble or water-dispersible and the solvent system is an aqueous solvent system such as water or a mixture of water with one or more polar organic materials such as lower oxyhydrocarbons for example lower **alcohols**, **ketones** and esters. *(emphasis added)*

Concerning the polymeric acid, Cao, Yong teaches the following:

[0097] In addition to these monomeric acid forms, R can be a polymeric backbone from which depend a plurality of acid functions "A." Examples of **polymeric acids** include sulfonated polystyrene, sulfonated polyethylene and the like. In these cases the polymer backbone can be selected either to enhance solubility in nonpolar substrates or be soluble in more highly polar substrates in which materials such as polymers, **polyacrylic acid** or poly(vinylsulfonate), or the like, can be used. *(emphasis added)*

Concerning the sulfonic acid, Cao, Yong teaches the following:

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[0109] Preferred functionalized protonic acids are organic **sulfonic acids** such as dodecylbenzene **sulfonic acid** and more preferably poly(2-acrylamido-2-methyl-1-propanesulfonic acid) ("PAAMPSA"). (*emphasis added*)

Concerning the product by process claims, Cao, Yong teaches the following:

In pixellated **electronic devices** such as polymer emissive displays (PEDs), good operating lifetime is achieved through the use of a high resistivity **buffer layer** of conductive organic polymer between the anode layer and the photoactive layer. The improved high resistivity **conductive layer** gives long lifetime with reduced or no cross-talk and current leakage between neighboring pixels.

(*emphasis added*)

Concerning the method of making the dispersion, Cao, Yong teaches the following:

[0115] We have had our best results using water-soluble or water-dispensable conjugated polymers together with water-soluble or water-dispensable bulk polymers. In this case, the blend can be formed by dissolving or **dispersing** the two polymers in water and casting a layer from the solution or dispersion.

(*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Cao, Yong (US5624605).

Concerning the dispersion, Cao, Yong teaches the following:

Another preferred method for the preparation of solutions containing the polyaniline homopolymer or copolymer and the functionalized protonic acid is where the polymer is synthesized directly in the presence of the functionalized protonic acid and in the non-polar or weakly polar solvent or plasticizing liquid, as described in Example B. This method is of special interest because the functionalized protonic acid acts as a surfactant in this **emulsion** polymerization, and yields high molecular weights of the polymers, and high conductivities of the resulting materials derived from the **emulsions**. (*emphasis added*)

Concerning the conductive polymer and the conductive, Cao, Yong teaches the following:

In the event that fourth or additional nonsoluble components are present (or suspended) in the solution or melt, the protonated **conductive polymer** will form around, or be filled with, the insoluble material. If, for example, the additional components are glass fibers, the relative amounts of fibers and protonated **conductive polymer** remaining will cause either the polymer to be fiber-filled,

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the fibers to be polymer coated or impregnated, or some intermediate composite of fibers and protonated **conductive polymer** to be formed. In the case of systems wherein the amount of non-soluble component greatly exceeds the protonated **conductive polymer** remaining, individual particles or shapes of non-soluble components coated or impregnated with protonated **conductive polymer** will be formed. Examples of articles formed from nonsoluble components and the present polymer solutions or melts include **conductive polymer** coated housings for sensitive electronic equipment (microprocessors), infrared and microwave absorbing shields, flexible electrical conducting connectors, **conductive** bearings, brushes and semi-conducting photoconductor junctions, antistatic materials for packaging electronic components, carpet fibers, waxes for floors in computer rooms and an antistatic spray finisher for plastics, and thin, optically transparent antistatic finishes for CRT screens, aircraft, auto windows and the like. (*emphasis added*)

Concerning the preferred conductive polymer, Cao, Yong teaches the following:

Aniline 2,5-Dimethylaniline o-Toluidine 2,3-Dimethylaniline m-Toluidine 2,5-Dibutylaniline o-Ethylaniline 2,5-Dimethoxyaniline m-Ethylaniline Tetrahydronaphthylamine o-Ethoxyaniline o-Cyanoaniline m-Butylaniline 2-Thiomethylaniline m-Hexylaniline 2,5-Dichloroaniline m-Octylaniline 3-(n-Butanesulfonic acid) 4-Bromoaniline aniline 2-Bromoaniline 3-Bromoaniline 2,4-Dimethoxyaniline 3-Acetamidoaniline 4-Mercaptoaniline 4-Acetamidoaniline 4-Methylthioaniline 5-Chloro-2-methoxyaniline 3-Phenoxyaniline 5-Chloro-2-ethoxyaniline 4-Phenoxyaniline (*emphasis added*)

Concerning the most preferred conductive polymer and the thiophene, Cao, Yong teaches the following:

Examples of semiconducting (i.e., materials with conductivities of up to 10.sup.-8 S-cm.sup.-1) include undoped or lightly doped conjugated homo- or copolymers such as **polythiophenes**, polypyrroles, polyacetylenes, polyparaphenylene sulfide, poly(paraphenylene vinylenes), and the like. (*emphasis added*)

Concerning the ethers, Cao, Yong teaches the following:

Illustrative of useful common solvents are the following materials: substituted or unsubstituted aromatic hydrocarbons such as benzene, toluene, p-xylene, m-xylene, naphthalene, ethylbenzene, styrene, aniline and the like; higher alkanes such as pentane, hexane, heptane, octane, nonane, decane and the like; cyclic alkanes such as decahydronaphthalene; halogenated alkanes such as chloroform, bromoform, dichloromethane and the like; halogenated aromatic hydrocarbons such as chlorobenzene, o-dichlorobenzene, m-dichlorobenzene, p-dichlorobenzene and the like; higher **alcohols** such as 2-butanol, 1-butanol, hexanol, pentanol, decanol, 2-methyl-1-propanol and the like; higher **ketones** such as hexanone, butanone, pentanone and the like; heterocyclics such as morpholine; perfluorinated hydrocarbons such as perfluorodecaline, perfluorobenzene and the

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like. Mixtures of such nonpolar organic solvents can also be used as for example mixtures of xylene and chlorobenzene. (*emphasis added*)

Concerning the polymeric acid, Cao, Yong teaches the following:

In addition to these monomeric acid forms, R.sub.1 can be a polymeric backbone from which depend a plurality of acid functions "A." Examples of **polymeric acids** include sulfonated polystyrene, sulfonated polyethylene and the like. In these cases the polymer backbone can be selected either to enhance solubility in nonpolar substrates or be soluble in more highly polar substrates in which materials such as polymers, **polyacrylic acid** or poly(vinylsulfonate), or the like, can be used. (*emphasis added*)

Concerning the sulfonic acid and the method of making the dispersion, Cao, Yong teaches the following:

For example, one **method of forming** the present products containing the protonated aniline polymer and the functionalized counter-ions is to react, simultaneously, the aniline polymer, the functionalized protonic acid and solvent as a liquid. Thus, for example, by introducing polyaniline as a solid powder, xylene as a liquid and dodecylbenzene **sulfonic acid** (DBSA) as a liquid into a mixing vessel, a solution of the protonated conductive polymer is formed, from which conductive polymer can be cast. The conditions of such mixing are not critical, provided that sufficient DBSA is used to dope the desired quantity of polymer and sufficient solvent is employed to reduce the viscosity of the solution to manageable levels. (*emphasis added*)

Concerning the polymers, Cao, Yong teaches the following:

This invention relates to conductive **polymers** and particularly to the use of functionalized protonic acids to induce processibility of electrically conductive substituted or unsubstituted polyanilines, and to induce solubility of electrically conductive substituted or unsubstituted polyanilines in **organic** liquids and/or fluid (melt) phases of solid **polymers**. Other aspects of this invention relate to the resulting solutions of electrically conductive substituted or unsubstituted polyanilines in **organic** liquids, to solution-processing methods of forming such solutions and to methods of using such solutions to form conducting polymer articles. Yet other aspects relate to solid phase **polymers** containing these protonic acids and their use in conductive articles. (*emphasis added*)

Concerning the product by process claims, Cao, Yong teaches the following:

It is also contemplated to use the present solutions or melts as such as either liquid conductors or liquid **semiconductors**, much in the manner that liquid mercury is used in various devices. Examples of such devices include gravity switches, fluid level detecting devices or other electrical or electronic switches. Such use is based upon the conductivity of the solution, which the case of polyaniline protonated with DBSA in xylene can represent a relatively high electrical conductivity. (*emphasis added*)

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Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Fahlman, Mats Anders Paul (US20050208328).

Concerning the dispersion, conductive polymer, conductive, polymers and the method of making the dispersion, Fahlman, Mats Anders Paul teaches the following:

2. The aqueous **dispersion** of claim 1, wherein the **dispersion** has a pH in the range of from about 1 to 8 and further comprises at least one selected from a **conductive polymer**, metal particles, **graphite fibers**, **graphite particles**, **carbon nanotubes**, **carbon nanoparticles**, **metal nanowires**, **organic conductive inks**, **organic conductive pastes**, **inorganic conductive inks**, **inorganic conductive pastes**, **charge transport materials**, **semiconductive inorganic oxide nano-particles**, **insulating inorganic oxide nano-particles**, **piezoelectric oxide nano-particles**, **piezoelectric polymers**, **pyrroelectric oxide nano-particles**, **pyrroelectric polymers**, **ferroelectric oxide nano-particles**, **ferroelectric polymers**, **dispersing agents**, **crosslinking agents** and combinations thereof. (*emphasis added*)

Concerning the preferred conductive polymer, most preferred conductive polymer and the thiophene, Fahlman, Mats Anders Paul teaches the following:

[0092] In one embodiment, the new composition further comprises only a low weight percentage of conductive additives. In another embodiment, the new composition comprising at least one conductive additive at weight percentage of an amount only to the extent needed to reach the percolation threshold. Examples of suitable conductive additives include, but are not limited to metal particles and nanoparticles, nanowires, carbon nanotubes, carbon nanoparticles, graphite fibers or particles, carbon particles, conductive polymers and combinations thereof. Conductive polymers include, but not limited to, **polythiophenes**, **polyanilines**, **polypyrroles**, and polyacetylenes. (*emphasis added*)

Concerning the ethers, Fahlman, Mats Anders Paul teaches the following:

[0051] Examples of suitable water-miscible organic liquids include, but are not limited to glycols, glycol **ethers**, **alcohols**, alcohol **ethers**, cyclic **ethers**, **ketones**, **nitriles**, **sulfoxides**, **amides**, and combinations thereof. In one embodiment, the organic liquid has a boiling point greater than about 100.degree. C. In one embodiment, the organic liquid comprises at least one glycol, glycol ether, cyclic ether, sulfoxide, amide, and combinations thereof. In one embodiment, the organic liquid comprises at least one N-methylpyrrolidone, ethylene glycol, dimethylacetamide, dimethyl formamide, dimethylsulfoxide, or combinations thereof. (*emphasis added*)

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Concerning the polymeric acid and the sulfonic acid, Fahlman, Mats Anders Paul teaches the following:

[0062] Colloid-forming **polymeric acids** contemplated for use in the practice of the invention are insoluble in water, and form colloids when dispersed into an aqueous medium and the colloid-forming **polymeric acid** is the **polymeric acid** colloids which exist as colloidal dispersion in fluids. The **polymeric acids** typically have a molecular weight in the range of about 10,000 to about 4,000,000. In one embodiment, the **polymeric acids** have a molecular weight of about 100,000 to about 2,000,000. Colloid particle size typically ranges from 2 nanometers (nm) to about 140 nm. In one embodiment, the new composition comprises **polymeric acid** colloids have a particle size of about 2 nm to about 30 nm. Any **polymeric acid** that is colloid-forming when dispersed in water is suitable for use in the practice of the invention. In one embodiment, the colloid-forming **polymeric acid** comprises at least one polymeric **sulfonic acid**. Other acceptable **polymeric acids** include polymer phosphoric acids, polymer carboxylic acids, **polymeric acrylic acids**, and mixtures thereof, including mixtures having **polymeric sulfonic acids**. In another embodiment, the polymeric **sulfonic acid** is fluorinated. In still another embodiment, the colloid-forming polymeric **sulfonic acid** is perfluorinated. In yet another embodiment, the colloid-forming polymeric **sulfonic acid** is a perfluoroalkylenesulfonic acid. (*emphasis added*)

Concerning the product by process claims, Fahlman, Mats Anders Paul teaches the following:

[0097] In one embodiment, the new compositions are deposited to form **buffer layers** in an **electronic device**. The term "**buffer layer**" as used herein, is intended to mean an electrically conductive or semiconductive **layer** which can be used between an anode and an active organic material. A **buffer layer** is believed to accomplish one or more function in an organic **electronic device**, including, but not limited to planarization of the underlying layer, hole transport, hole injection, scavenging of impurities, such as oxygen and metal ions, among other aspects to facilitate or to improve the performance of an organic **electronic device**. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu, Che-Hsiung (US20040127637).

Concerning the dispersion, conductive polymer, conductive, preferred conductive polymer, most preferred conductive polymer, thiophene, polymeric acid, polymers and the product by process claims, Hsu, Che-Hsiung teaches the following:

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[0065] In another embodiment, there are provided **buffer layers** cast from aqueous **dispersions** comprising polymeric **aniline** and colloid-forming **polymeric acids** blended with other water soluble or dispersible materials. Depending on the final application of the inventive composition, examples of types of additional materials which can be added include, but are not limited to, **polymers, carbon nanotubes, nanowires, dyes, coating aids, organic and inorganic conductive inks and pastes, charge transport materials, crosslinking agents**, and combinations thereof. The other water soluble or dispersible materials can be simple molecules or **polymers**. Examples of suitable **polymers** include, but are not limited to, **conductive polymers** such as **polythiophenes, polyanilines, polyamine, polypyrroles, polyacetylenes**, and combinations thereof. (*emphasis added*)

Concerning the ethers and the method of making the dispersion, Hsu, Che-Hsiung teaches the following:

35. A **method according to** claim 34, wherein the co-dispersing liquid is selected from **ethers, alcohols, alcohol ethers, cyclic ethers, ketones, nitriles, sulfoxides, amides**, and combinations thereof. (*emphasis added*)

Concerning the sulfonic acid, Hsu, Che-Hsiung teaches the following:

[0088] The buffer layer can further be overcoated with a layer of conductive polymer applied from aqueous solution or solvent. The conductive polymer can facilitate charge transfer and also improve coatability. Examples of suitable conductive polymers include, but are not limited to, polyanilines, polythiophenes, polythiophene-polymeric-acid-colloids such as those disclosed in co-pending application Dupont number PE 0688, or polythiophene/polystyrenesulfonic acid, polypyrroles, polyacetylenes, and combinations thereof. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu, Che-Hsiung (US20050205860).

Concerning the dispersion, conductive polymer and the conductive, Hsu, Che-Hsiung teaches the following:

[0084] In another embodiment, more **conductive dispersions** are formed by the addition of highly **conductive** additives to the aqueous **dispersions** of polypyrrole and the colloid-forming polymeric acid. Because **dispersions** with relatively high pH can be formed, the **conductive** additives, especially metal additives, are not attacked by the acid in the **dispersion**. Moreover, because the polymeric acids are colloidal in nature, having the surfaces predominately containing acid groups, electrically conducting polypyrrole is formed on the colloidal surfaces. Because of this unique structure, only a low weight percentage of highly **conductive** additives, is needed to reach the percolation threshold. Examples of suitable **conductive** additives include, but are not limited to **conductive polymers, metal**

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particles and nanoparticles, metal nanowires, carbon nanotubes, carbon nanoparticles, graphite fibers or particles, carbon particles, and combinations thereof. A dispersing agent may be included to facilitate dispersing of the **conductive** additives. (*emphasis added*)

Concerning the preferred conductive polymer, most preferred conductive polymer, thiophene, sulfonic acid and the product by process claims, Hsu, Che-Hsiung teaches the following:

[0115] The **buffer layer**, or the electrically conductive or electrically **semiconductive layer**, can further be overcoated with a layer of conductive polymer applied from aqueous solution or solvent. The conductive polymer can facilitate charge transfer and also improve coatability. Examples of suitable conductive polymers include, but are not limited to, **polyanilines**, **polythiophenes**, polyanilin/polymeric-acid-c- olloids such as those disclosed in co-pending application Ser. No. 10/669577, **polythiophene**/polymeric-acid-colloids such as those disclosed in co-pending application Ser. No. 10/669494, or **polythiophene**/polystyren- **esulfonic acid**, **polypyrroles**, polyacetylenes, and combinations thereof. (*emphasis added*)

Concerning the ethers, Hsu, Che-Hsiung teaches the following:

[0064] In one embodiment, the polymerization is carried out in the presence of co-dispersing liquids which are miscible with water. Examples of suitable co-dispersing liquids include, but are not limited to **ethers**, **alcohols**, alcohol **ethers**, cyclic **ethers**, **ketones**, nitrites, **sulfoxides**, **amides**, and combinations thereof. In one embodiment, the co-dispersing liquid comprises at least one alcohol. In one embodiment, the co-dispersing liquid comprises at least one organic solvent selected from n-propanol, isopropanol, t-butanol, dimethylacetamide, dimethylformamide, N-methylpyrrolidone, and mixtures thereof. In one embodiment, the amount of co-dispersing liquid is less than about 60% by volume. In one embodiment, the amount of co-dispersing liquid is less than about 30% by volume. In one embodiment, the amount of co-dispersing liquid is between about 5 and 50% by volume. The use of a co-dispersing liquid in the polymerization significantly reduces particle size and improves filterability of the dispersions. In one embodiment, buffer layer materials obtained by this process show an increased viscosity and films prepared from these dispersions are of high quality. (*emphasis added*)

Concerning the polymeric acid, Hsu, Che-Hsiung teaches the following:

8. A composition according to claim 1, wherein said colloid-forming **polymeric acid** is selected from **polymeric sulfonic acids**, **polymeric carboxylic acids**, **polymeric acrylic acids**, **polymeric phosphoric acids**, **polymeric phosphonic acids**, and mixtures thereof. (*emphasis added*)

Concerning the polymers and the method of making the dispersion, Hsu, Che-Hsiung teaches the following:

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[0116] The composition comprising such a layer may further comprise conductive **polymers**, and may also comprise **dyes, carbon nanotubes, carbon nanoparticles, metal nanowires, metal nanoparticles, carbon fibers** and particles, **graphite fibers** and particles, **coating aids, organic and inorganic conductive inks and pastes, charge transport materials, semiconductive or insulating inorganic oxide particles, piezoelectric, pyroelectric, or ferroelectric oxide nano-particles or polymers, photoconductive oxide nanoparticles or polymers, photoconductive polymers, dispersing agents, crosslinking agents** and combinations thereof. These materials can be added to the new composition either before or after polymerization of the monomer and/or before or after treatment with at least one ion exchange resin. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Cao, Yong (US20040254297).

Concerning the dispersion, Cao, Yong teaches the following:

[0081] The synthesis of FSA polymers is well known. The FSA polymers can be prepared as colloidal aqueous **dispersions**. They may also be in the form of **dispersions** in other media, examples of which include, but are not limited to, alcohol, water-soluble ethers, such as tetrahydrofuran, mixtures of water-soluble ethers, and combinations thereof. In making the **dispersions**, the polymer can be used in acid form. U.S. Pat. Nos. 4,433,082, 6,150,426 and WO 03/006537 disclose methods for making of aqueous **dispersions**. After the **dispersion** is made, the concentration and the dispersing liquid composition can be adjusted by methods known in the art. (*emphasis added*)

Concerning the conductive polymer, conductive, preferred conductive polymer, most preferred conductive polymer, thiophene, sulfonic acid, polymers, product by process claims and the method of making the dispersion, Cao, Yong teaches the following:

[0148] The layer in an **organic electronic device** comprising the new composition may further comprise a layer of **conductive polymer** applied from aqueous solution or solvent. The **conductive polymer** can facilitate charge transfer and also improve coatability. Examples of suitable **conductive polymers** include, but are not limited to, **polyanilines, polythiophenes, polydioxothiophene/polystyrenesulfonic acid, polyaniline/polymeric-acid-colloids** such as those disclosed in co-pending application Ser. No. 10/669,577, **polythiophene/polymeric-acid-colloids** such as those disclosed in co-pending application Ser. No. 10/669,494, **polypyrroles, polyacetylenes**, and combinations thereof. The composition comprising such a layer may further comprise **conductive polymers**, and may also comprise **dyes, carbon nanotubes, carbon nanoparticles, metal nanowires, metal nanoparticles, carbon fibers** and particles, **graphite fibers** and particles, **coating aids, organic and inorganic conductive inks and pastes, charge transport materials, semiconductive or**

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insulating **inorganic** oxide particles, **piezoelectric**, **pyroelectric**, or **ferroelectric oxide nano-particles** or **polymers**, **photoconductive** oxide nanoparticles or **polymers**, **dispersing agents**, **crosslinking agents** and combinations thereof. These materials can be added to the new composition either before or after polymerization of the monomer and/or before or after treatment with at least one ion exchange resin. (*emphasis added*)

Concerning the ethers, Cao, Yong teaches the following:

[0100] Co-dispersing liquids contemplated for use in the new composition are generally polar, water-miscible organic liquids. Examples of suitable types of co-dispersing liquids include, but are not limited to, **ethers**, cyclic **ethers**, **alcohols**, alcohol **ethers**, **ketones**, **nitriles**, **sulfides**, **sulfoxides**, **amides**, **amines**, **carboxylic acids**, and the like, as well as combinations of any two or more thereof. (*emphasis added*)

Concerning the polymeric acid, Cao, Yong teaches the following:

2. A composition according to claim 1, wherein said colloid-forming **polymeric acid** comprises a **polymeric sulfonic acids**, **polymeric phosphoric acids**, **polymeric phosphonic acids**, **polymeric carboxylic acids**, **polymeric acrylic acids**, and mixtures thereof. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu, Che-Hsiung (US20050209388).

Concerning the dispersion, Hsu, Che-Hsiung teaches the following:

[0104] The first and second ion exchange resins may contact the aqueous **dispersion** either simultaneously, or consecutively. For example, in one embodiment both resins are added simultaneously to an aqueous **dispersion** of an electrically conducting polymer, and allowed to remain in contact with the **dispersion** for at least about 1 hour, e.g., about 2 hours to about 20 hours. The ion exchange resins can then be removed from the **dispersion** by filtration. The size of the filter is chosen so that the relatively large ion exchange resin particles will be removed while the smaller **dispersion** particles will pass through. Without wishing to be bound by theory, it is believed that the ion exchange resins quench polymerization and effectively remove ionic and non-ionic impurities and most of unreacted monomer from the aqueous **dispersion**. Moreover, the basic, anion exchange and/or acidic, cation exchange resins renders the acidic sites more basic, resulting in increased pH of the **dispersion**. In general, about one to five grams of ion exchange resin is used per gram of conducting polymer/polymeric acid colloid. (*emphasis added*)

Concerning the conductive polymer, conductive, preferred conductive polymer, most preferred conductive polymer, thiophene, sulfonic acid, polymers, product by process claims and the method of making the dispersion, Hsu, Che-Hsiung teaches the following:

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[0132] In such devices, the layer, which may be a **buffer layer**, can further be overcoated with a layer of **conductive polymer** applied from aqueous solution or solvent. The **conductive polymer** can facilitate charge transfer and also improve coatability. Examples of suitable **conductive polymers** include, but are not limited to, **polyanilines**, **polythiophenes**, **polydioxythiophene/-polystyrenesulfonic acid**, **polyaniline/polymeric-acid--** colloids such as those disclosed in co-pending application Ser. No. 10/669577, **polythiophene/polymeric-acid-colloids** such as those disclosed in co-pending application Ser. No. 10/669494, **polypyrroles**, **polyacetylenes**, and combinations thereof. The composition comprising such a layer may further comprise **conductive polymers**, and may also comprise **dyes**, **carbon nanotubes**, **carbon nanoparticles**, **metal nanowires**, **metal nanoparticles**, **carbon fibers** and particles, **graphite fibers** and particles, **coating aids**, **organic and inorganic conductive inks and pastes**, **charge transport materials**, **semiconductive or insulating inorganic oxide particles**, **piezoelectric**, **pyroelectric**, or **ferroelectric oxide nano-particles or polymers**, **photoconductive oxide nanoparticles or polymers**, **dispersing agents**, **crosslinking agents** and combinations thereof. These materials can be added to the new composition either before or after polymerization of the monomer and/or before or after treatment with at least one ion exchange resin. (*emphasis added*)

Concerning the ethers, Hsu, Che-Hsiung teaches the following:

[0067] The organic liquid used in the new composition is one which is miscible with water. Examples of suitable organic liquids include, but are not limited to glycols, glycol **ethers**, **alcohols**, alcohol **ethers**, cyclic **ethers**, **ketones**, **nitriles**, **sulfoxides**, **amides**, and combinations thereof. In one embodiment, the organic liquid has a boiling point greater than about 100.degree. C. In one embodiment, the organic liquid is selected from glycols, glycol **ethers**, cyclic **ethers**, **sulfoxides**, **amides**, and combinations thereof. In one embodiment, the organic liquid is selected from N-methylpyrrolidone, ethylene glycol, dimethylacetamide, dimethyl formamide, dimethylsulfoxide, and combinations thereof. (*emphasis added*)

Concerning the polymeric acid, Hsu, Che-Hsiung teaches the following:

10. A composition according to claim 1, wherein said colloid-forming **polymeric acid** comprises an acid that is selected from **polymeric sulfonic acids**, **polymeric carboxylic acids**, **polymeric acrylic acids**, **polymeric phosphoric acids**, **polymeric phosphonic acids**, and mixtures thereof. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Cao, Yong (US20040102577).

Concerning the dispersion, conductive polymer, conductive, preferred conductive polymer, most

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preferred conductive polymer, thiophene, ethers, polymeric acid, polymers and the product by process claims, Cao, Yong teaches the following:

[0067] In another embodiment, there are provided **buffer layers** cast from aqueous **dispersions** comprising **polythiophene**, including polymeric dioxothiophene, and colloid-forming **polymeric acids** blended with other water soluble or dispersible materials. Depending on the final application of the material, examples of types of additional water soluble or dispersible materials which can be added include, but are not limited to **polymers, dyes, coating aids, carbon nanotubes**, nanowires, **organic and inorganic conductive inks and pastes, charge transport materials, crosslinking agents**, and combinations thereof. The materials can be simple molecules or **polymers**. Examples of suitable other water soluble or dispersible **polymers** include, but are not limited to, **conductive polymers** such as **polythiophenes, polyanilines, polyamines, polypyrroles**, polyacetylenes, and combinations thereof. (*emphasis added*)

Concerning the sulfonic acid, Cao, Yong teaches the following:

[0093] In still another embodiment of the invention, there are provided methods for producing, aqueous dispersions of polydioxothiophenes comprising polymerizing dioxothiophene monomers in the presence of polymeric **sulfonic acid** colloids. In one embodiment of the invention methods, the polydioxothiophene is a polyalkylenedioxothiophene and the colloid-forming polymeric **sulfonic acid** is fluorinated. In another embodiment of the invention methods, the polydioxothiophene is poly(3,4-ethylenedioxothiophene) and the colloid-forming polymeric **sulfonic acid** is perfluorinated. In still another embodiment, the colloid-forming polymeric **sulfonic acid** is perfluoroethylenesulfonic acid. The polymerization is carried out in the presence of water. The resulting reaction mixture can be treated with ion exchange resins to remove reaction byproducts. (*emphasis added*)

Concerning the method of making the dispersion, Cao, Yong teaches the following:

[0053] The polymerization can be carried out in the presence of co-**dispersing** liquids which are miscible with water. Examples of suitable co-**dispersing** liquids include, but are not limited to ethers, alcohols, al ethers, cyclic ethers, ketones, nitrites, sulfoxides, and combinations thereof. In one embodiment, the amount of co-**dispersing** liquid should be less than 30% by volume. In one embodiment, the amount of co-**dispersing** liquid is less than 60% by volume. In one embodiment, the amount of co-**dispersing** liquid is between 5% to 50% by volume. In one embodiment, the co-**dispersing** liquid is an alcohol. In one embodiment, the co-**dispersing** liquid is selected from n-propanol, isopropanol, t-butanol, methanol dimethylacetamide, dimethylformamide, N-methylpyrrolidone. The acid can be an inorganic acid, such as HCl, sulfuric acid, and the like, or an organic acid, such as p-toluenesulfonic acid, dodecylbenzenesulfonic acid, methanesulfonic acid, trifluoromethanesulfonic acid, camphorsulfonic acid, acetic acid and the like. Alternatively, the acid can be a water soluble polymeric acid such as

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poly(styrenesulfonic acid), poly(2-acrylamido-2-methyl-1-propanesulfonic acid, or the like, or a second colloid-forming acid, as described above. Combinations of acids can be used. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ding, Yiwei (US6228492).

Concerning the dispersion, Ding, Yiwei teaches the following:

The filament components of the fiber may be extruded by any spinning process suitable for the manufacture of fibers from a particular polymer, including, for example, melt spinning, reaction spinning, plasticized-melt spinning, tack spinning, wet spinning, **dispersion** spinning, dry-spinning, dry-jet wet spinning or air-gap spinning, **emulsion** spinning, gel spinning, grid spinning, reaction spinning and the like. In general, these spinning processes comprise forcing a polymer melt or solution through multiple holes in a spinneret to generate liquid polymer streams that solidify into filaments which are ultimately combined together into a fiber. The preferred technique for spinning the filaments is by a melt-spinning process which will be described in more detail below. (*emphasis added*)

Concerning the conductive polymer and the conductive, Ding, Yiwei teaches the following:

A process for preparing fibers containing intrinsically **conductive polymers** comprises extruding two or more filaments, applying a coating formulation containing a salt of an intrinsically **conductive polymer** to at least one of the filaments to form a coated filament, combining the filaments to form a filament bundle, and processing the bundle into a fiber. A filament coated with an intrinsically **conductive polymer** and a fiber comprising at least one coated filament are also provided which are useful in preparing textiles and other materials which exhibit conductivity.

(*emphasis added*)

Concerning the preferred conductive polymer, most preferred conductive polymer, thiophene and the polymers, Ding, Yiwei teaches the following:

Preferably, the ICP in the coating formulation is an ICP that provides the resulting fiber with electrical conductivity in a dry environment. Examples of ICP's useful in the present invention include but are not limited to: polyacetylene; **polyaniline**; polycarbazole; polyfuran; polyheteroarylenevinylene, in which the heteroarylene group is **thiophene**, furan or **pyrrole**; polyisothionaphene; polyparaphenylene;

polyparaphenylene sulphide; polyparaphenylene vinylene; polyperinaphthalene; polyphthalocyanine; **polypyrrole**; polyquinoline; and **polythiophene**. Useful ICP's also include mixtures, **copolymers**, and derivatives of the aforesaid **polymers**, e.g., in which the monomer components have substituted side chains or groups. ICP's preferred for use in the present invention are **polyaniline**, **polypyrrole**, and **polythiophene**. (*emphasis added*)

Concerning the ethers, Ding, Yiwei teaches the following:

A polar organic solvent suitable as a conductivity-enhancing agent is one in which the polyaniline composition is insoluble so that polyaniline is not extracted by treatment with the solvent. By insoluble it is meant that the polyaniline has a solubility in the polar organic solvent of less than about 1%. Polar organic solvents useful as conductivity enhancing agents include but are not limited to **alcohols**, esters, **ethers**, **ketones**, anilines and mixtures thereof. Preferred polar organic solvents include the **alcohols**, methanol, ethanol, isopropanol and the like. As would be readily understood by one skilled in the art, the time the polyaniline-containing coating is contacted with the polar organic solvent will depend both upon the solubility of the organic acid in the polar organic solvent and on the desired amount of increased conductivity. Typically, conductivity of the polyaniline coating may be enhanced by contacting the coating with methanol or acetone for about one minute or less. One skilled in the art can readily determine the optimal parameters to use to achieve the desired increase in conductivity. (*emphasis added*)

Concerning the sulfonic acid, Ding, Yiwei teaches the following:

An especially preferred organic acid salt of polyaniline is one prepared by an emulsion-polymerization method as described in U.S. Pat. No. 5,567,356 to Kinlen, which is hereby incorporated herein by reference. Briefly, the method disclosed in that patent involves combining water, a water-solubilizing organic solvent, an organic acid that is soluble in the organic solvent, aniline, and a radical initiator. A preferred organic solvent for use in this emulsion-polymerization method is 2-butoxyethanol. The organic acid soluble in the water-solubilizing organic solvent can be any one of a number of organic acids including **sulfonic acids**, phosphorus-containing acids, carboxylic acids or mixtures thereof. Preferred organic **sulfonic acids** are dodecylbenzene **sulfonic acid**, dinonylnaphthalenesulfonic acid (DNNSA), dinonylnaphthalenedisulfonic acid, p-toluene **sulfonic acid**, or mixtures thereof. A most preferred organic **sulfonic acid** is DNNSA. Preferably, the polymerization reaction mixture contains DNNSA and aniline in a mole ratio of 1.2:1. (*emphasis added*)

Concerning the method of making the dispersion, Ding, Yiwei teaches the following:

For example, techniques suggested to increase conductivity in polyester fibers include **dispersing** fibrils comprised of a hydrophilic or conductive polymer in the polyester matrix, forming sheath-core bicomponent fibers with a polymer containing conductive carbon black or a metal oxide in the sheath or in the core,

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and metallizing or graphitizing the fiber surface. See, e.g., J. E. McIntyre, Polyester Fibers, in Fiber Chemistry, 40-41, 1-71 (Menachim Lewin & Eli M. Pearce eds., 1985), incorporated herein by reference. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Parker, Ian D. (US20020036291).

Concerning the dispersion, polymers and the method of making the dispersion, Parker, Ian D. teaches the following:

[0127] We have had our best results using water-soluble or water-dispensable conjugated **polymers** together with water-soluble or water-dispensable bulk **polymers**. In this case, the blend can be formed by dissolving or **dispersing** the two **polymers** in water and casting a layer from the solution or **dispersion**. (*emphasis added*)

Concerning the conductive polymer, conductive, preferred conductive polymer, most preferred conductive polymer and the thiophene, Parker, Ian D. teaches the following:

[0078] When the terms "**polyaniline**" or PANI are used herein, they are used generically to include substituted and unsubstituted materials, as well as other equivalent conjugated **conductive polymers** such as the **polypyrroles**, or the **polythiophenes**, for example poly(ethylenedioxythioph- ene) ("PEDT") unless the context is clear that only the specific nonsubstituted form is intended. It is also used in a manner to include any accompanying dopants, particularly acidic materials used to render the **polyaniline conductive**. (*emphasis added*)

Concerning the ethers, Parker, Ian D. teaches the following:

[0134] In the preferred systems, the PANI and bulk polymer are both water-soluble or water-dispersible and the solvent system is an aqueous solvent system such as water or a mixture of water with one or more polar organic materials such as lower oxyhydrocarbons for example lower **alcohols**, **ketones** and esters. (*emphasis added*)

Concerning the polymeric acid, Parker, Ian D. teaches the following:

[0109] In addition to these monomer ic acid forms, R can be a polymeric backbone from which depend a plurality of acid functions "A. " Examples of **polymeric acids** include sulfonated polystyrene, sulfonated polyethylene and the like. In these cases the polymer backbone can be selected either to enhance solubility in nonpolar substrates or be soluble in more highly polar substrates in which materials such as polymers, **polyacrylic acid** or poly(vinylsulfonate), or the like, can be used. (*emphasis added*)

Concerning the sulfonic acid, Parker, Ian D. teaches the following:

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[0121] Preferred functionalized protonic acids are organic **sulfonic acids** such as dodecylbenzene **sulfonic acid** and more preferably poly(2-acrylamido-2-methyl-1-propanesulfonic acid) ("PAAMPSA"). (*emphasis added*)

Concerning the product by process claims, Parker, Ian D. teaches the following:

11. An **electronic device** comprising a photoactive layer between a cathode and an anode, wherein the anode is a multilayer anode including a first anode layer comprising high conductivity transparent inorganic contact layer, a second anode layer adjacent to the first anode layer, said second anode layer comprising conjugated conductive organic polymer and having a low conductivity and a third anode layer between said second anode layer and said photoactive layer, said third anode layer comprising a conductive organic polymer and having a higher conductivity resistance than said second anode layer. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Cao, Yong (US5968416).

Concerning the dispersion, Cao, Yong teaches the following:

Another preferred method for the preparation of solutions containing the polyaniline homopolymer or copolymer and the functionalized protonic acid is where the substrate polymer is synthesized directly in the presence of the functionalized protonic acid and in the non-polar or weakly polar solvent. This method is of special interest because the functionalized protonic acid acts as a surfactant in this **emulsion** polymerization, and yields high molecular weights of the polymers, and high conductivities of the resulting materials derived from the **emulsions**. (*emphasis added*)

Concerning the conductive polymer and the conductive, Cao, Yong teaches the following:

In the event that fourth or additional nonsoluble components are present (or suspended) in the solution or melt, the protonated **conductive polymer** will form around, or be filled with, the insoluble material. If, for example, the additional components are glass fibers, the relative amounts of fibers and protonated **conductive polymer** remaining will cause either the polymer to be fiber-filled, the fibers to be polymer coated or impregnated, or some intermediate composite of fibers and protonated **conductive polymer** to be formed. (*emphasis added*)

Concerning the preferred conductive polymer, Cao, Yong teaches the following:

_____ Aniline 2,5-Dimethylaniline o-Toluidine 2,3-Dimethylaniline m-Toluidine 2,5-Dibutylaniline o-Ethylaniline 2,5-Dimethoxyaniline m-Ethylaniline Tetrahydronaphthylamine o-Ethoxyaniline o-Cyanoaniline m-Butylaniline 2-Thiomethylaniline m-Hexylaniline 2,5-Dichloroaniline m-Octylaniline 3-(n-Butanesulfonic acid) 4-Bromoaniline aniline 2-Bromoaniline 2,4 Dimethoxyaniline 3-Bromoaniline 4-

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Mercaptoaniline 3-Acetamidoaniline 4-Methylthioaniline 4-Acetamidoaniline 3-Phenoxyaniline 5-Chloro-2-methoxyaniline 4-phenoxyaniline 5-Chloro-2-ethoxyaniline

(emphasis added)

Concerning the most preferred conductive polymer and the thiophene, Cao, Yong teaches the following:

Examples of semiconducting materials (i.e., materials with conductivities of 10^{-8} S-cm. $^{-1}$) include undoped or lightly doped conjugated homo- or copolymers such as **polythiophenes**, polypyrroles, polyacetylenes, poly-paraphenylene sulfide, poly(paraphenylene vinylenes), and the like. *(emphasis added)*

Concerning the ethers, Cao, Yong teaches the following:

Illustrative of useful common solvents are the following materials: substituted or unsubstituted aromatic hydrocarbons such as benzene, toluene, p-xylene, m-xylene, naphthalene, ethylbenzene, styrene, aniline and the like; higher alkanes such as pentane, hexane, heptane, octane, nonane, decane and the like; cyclic alkanes such as decahydronaphthalene; halogenated alkanes such as chloroform, bromoform, dichloromethane and the like; halogenated aromatic hydrocarbons such as chlorobenzene, o-dichlorobenzene, m-dichlorobenzene, p-dichlorobenzene and the like; higher **alcohols** such as 2-butanol, 1-butanol, hexanol, pentanol, decanol, 2-methyl-1-propanol and the like; higher **ketones** such as hexanone, butanone, pentanone and the like; heterocyclics such as morpholine; perfluorinated hydrocarbons such as perfluorodecaline, perfluorobenzene and the like. Mixtures of such nonpolar organic solvents can also be used, such as mixtures of xylene and chlorobenzene. *(emphasis added)*

Concerning the polymeric acid, Cao, Yong teaches the following:

In addition to these monomeric acid forms, R.sub.1 can be a polymeric backbone from which depend a plurality of acid functions "A." Examples of **polymeric acids** include sulfonated polystyrene, sulfonated polyethylene and the like. In these cases the polymer backbone can be selected either to enhance solubility in nonpolar substrates or be soluble in more highly polar substrates in which materials such as polymers, **polyacrylic acid** or poly(vinylsulfonate), or the like, can be used. *(emphasis added)*

Concerning the sulfonic acid, Cao, Yong teaches the following:

15. The solid transparent conductor according to claim 1 wherein said substrate comprises a nonpolar or weakly polar polymer and the counterion functionalized to be compatible with nonpolar or weakly polar organic solvents, molten or liquefied oligomers or polymers is of the Formula VI-VII: ##STR7## wherein: A is **sulfonic acid**, selenic acid, phosphonic acid, a carboxylic acid, hydrogen sulfate, hydrogen selenate, or hydrogen phosphate; *(emphasis added)*

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Concerning the polymers, Cao, Yong teaches the following:

It is accordingly an object of the present invention to overcome the aforementioned disadvantages of the prior art and, primarily, to provide electrically conducting and optically transparent bodies, coatings and films for uses such as electrodes, these materials being fabricated using functionalized protonic acids to induce processibility of electrically conductive polyaniline and blends of electrically conductive polyaniline with amorphous bulk **polymers**. The functionalized protonic acids induce solubility of electrically conductive polyaniline and blends of electrically conductive polyaniline in amorphous bulk **polymers**, in **organic** liquids and in fluid (melt) phases of solid bulk **polymers** and **prepolymers**. (*emphasis added*)

Concerning the product by process claims, Cao, Yong teaches the following:

It is additionally an object of the present invention to provide transparent conducting materials formed from polyblends of polyaniline with amorphous bulk polymers. Said polyblends are re-soluble in common organic solvents, thus enabling the use of photolithographic techniques for patterning the transparent material; said techniques being, for example, routinely used in the **semiconductor** industry. (*emphasis added*)

Concerning the method of making the dispersion, Cao, Yong teaches the following:

For example, one **method of forming** the present products containing the protonated aniline polymer and the functionalized counter-ions is to react, simultaneously, the aniline polymer, the functionalized protonic acid and the substrate solvent or polymer as a liquid. Thus, for example, by introducing polyaniline as a solid powder, m-cresol substrate as a liquid and (.+-.)-10-camphor sulfonic acid (CSA) as a solid into a mixing vessel, a solution of the protonated conductive polymer is formed, from which conductive electrodes can be cast. The conditions of such mixing are not critical, provided that sufficient CSA is used to dope the desired quantity of polymer and sufficient solvent is employed to reduce the viscosity of the solution to manageable levels. (*emphasis added*)

Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang, Chi (US20020031602).

Concerning the dispersion, polymers and the method of making the dispersion, Zhang, Chi teaches the following:

[0118] We have had our best results using water-soluble or water-dispensable conjugated **polymers** together with water-soluble or water-dispensable bulk **polymers**. In this case, the blend can be formed by dissolving or **dispersing** the two **polymers** in water and casting a layer from the solution or **dispersion**. (*emphasis added*)

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Concerning the conductive polymer, conductive, preferred conductive polymer, most preferred conductive polymer, thiophene and the product by process claims, Zhang, Chi teaches the following:

[0068] The **buffer layer 112** facilitates hole injection/transport. The **buffer layer 112** may include **polyaniline (PANI)** or an equivalent conjugated **conductive polymer** such as polypyrrole or **polythiophene**, most commonly in a blend with one or more **nonconductive polymers**. Polyaniline is particularly useful. Most commonly it is in the emeraldine salt (ES) form. Useful **conductive polyanilines** include the homopolymer and derivatives usually as blends with bulk polymers (also known as host polymers). Examples of PANI are those disclosed in U.S. Pat. No. 5,232,631. The preferred PANI blend materials for this layer have a bulk conductivity of from about 10.sup.-4 S/cm to 10.sup.-11 S/cm. More preferred PANI blends have a bulk conductivity of from 10.sup.-5 S/cm to 10.sup.-8 S/cm. (*emphasis added*)

Concerning the ethers, Zhang, Chi teaches the following:

[0125] In the preferred systems, the PANI and bulk polymer are both water-soluble or water-dispersible and the solvent system is an aqueous solvent system such as water or a mixture of water with one or more polar organic materials such as lower oxyhydrocarbons for example lower **alcohols, ketones** and esters. (*emphasis added*)

Concerning the polymeric acid, Zhang, Chi teaches the following:

[0100] In addition to these monomeric acid forms, R can be a polymeric backbone from which depend a plurality of acid functions "A." Examples of **polymeric acids** include sulfonated polystyrene, sulfonated polyethylene and the like. In these cases the polymer backbone can be selected either to enhance solubility in nonpolar substrates or be soluble in more highly polar substrates in which materials such as polymers, **polyacrylic acid** or poly(vinylsulfonate), or the like, can be used. (*emphasis added*)

Concerning the sulfonic acid, Zhang, Chi teaches the following:

[0112] Preferred functionalized protonic acids are organic **sulfonic acids** such as dodecylbenzene **sulfonic acid** and more preferably poly(2-acrylamido-2-methyl-1-propanesulfonic acid) ("PAAMPSA"). (*emphasis added*)

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible

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harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-57 of copending Application No. 10669494. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims more broadly describe the possible selection of various conductive polymers whereas the prior art requires a specific conductive polymer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-53 of copending Application No. 10669577. Although the conflicting claims are not identical, they are not patentably distinct

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from each other because the instant claims more broadly describe the possible selection of various conductive polymers whereas the prior art requires a specific conductive polymer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

5. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-28 of copending Application No. 10802704. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims more broadly describe the possible selection of various conductive polymers whereas the prior art requires a specific conductive polymer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

6. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-31 of copending Application No. 10802341. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims more broadly describe the possible selection of various conductive polymers whereas the prior art requires a specific conductive polymer.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-23 of copending Application No. 10802138. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims more broadly describe the possible selection of various conductive polymers whereas the prior art requires a specific conductive polymer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Claims 1-21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-23 of copending Application No. 10803114. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims more broadly describe the possible selection of various conductive polymers whereas the prior art requires a specific conductive polymer.

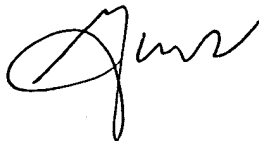
This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglass McGinty can be reached on (571)272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Gregory E. Webb
Primary Examiner
Art Unit 1751

gew